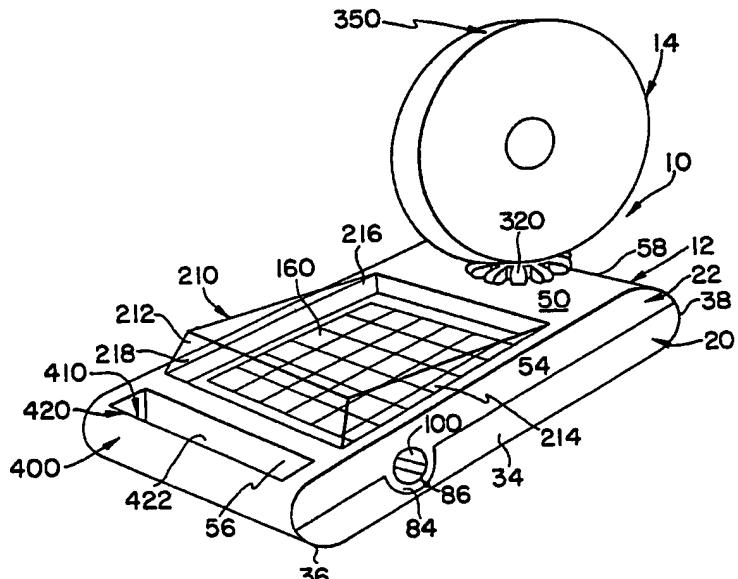




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(54) Title: EMERGENCY AND HAZARD SIGNAL AND WARNING LIGHT



(57) Abstract

A pair of housing half (20, 22) are respectfully molded from suitable plastic and so as to form when assembled together a component receiving space, a mount for a signal/warning light and handle (400) to grasp and hand transport the device. A window (200) extends through a top of the housing half formed to comprise the top housing and is covered by a wedge shaped clear plastic cover (210). Disposed within the housing below the cover and proximate the window (200) is a solar energy collection panel (160). Suitable electrical circuit elements and rechargeable batteries (130) are disposed within the housing to energize a light bulb (330) carried thereby and to illuminate a lens arrangement.

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EMERGENCY AND HAZARD SIGNAL AND WARNING LIGHTBACKGROUND OF THE INVENTION-FIELD OF APPLICATION

This invention relates to lights utilized to direct attention to emergency and/or hazardous conditions; and more particularly to such signal and warning lights which are battery powered and provided with solar cell energy collection for recharging the batteries.

BACKGROUND OF THE INVENTION-DESCRIPTION OF THE PRIOR ART

Emergency, hazardous and other conditions often require the control of the flow of traffic around, in or near the area where the condition exists. The traffic may be pedestrian or vehicular and the reason for the control is usually to protect persons and vehicles which must pass near the area where the condition exists as well as providing a warning and restricting access to such area.

Barrier tapes, such as shown and described in United States Letters Patent Number 4,844,420 granted on July 4, 1989 to N.R. Oster for "Retractable Crowd Control Barrier", are sometimes utilized for such traffic control but use of this type of device at night requires that the area be otherwise illuminated. Devices such as that shown and described in United States Letters Patent Number 3,917,231 granted on November 4, 1975 to R. Fink for "Flexible Traffic Barrier" provide a battery powered flashing light to draw attention to the barrier but batteries wear out and must be

replaced resulting in a possibly undesired maintenance expense especially where the barrier is remotely located and must be travelled to for maintenance purposes and especially since flashing lights have a tendency to wear out battery powered electrical supplies relatively quickly. At times more than one light source may be utilized, such as shown and described for the life jacket of United States Letters Patent Number 2,741,692 granted on August 2, 1955 to W.D. Nupp et al for "Portable Electronic Identification Light" however the more light sources the quicker the battery wear down. In addition barrier tapes and lights such as those shown and described are not suitable for use with moving vehicular traffic.

On the other hand, a device such as that shown and described in United States Letters Patent Number 4,535,331 granted on August 13, 1985 to K.L. Koenig for "Portable Traffic Warning Light" appears to be designed for use in vehicular situations. However, the relatively large number of lights and relatively large battery power supply required for this type of device reduce its relative portability and may increase battery maintenance thus reducing possible utility of this type of signal and warning device.

Devices such as those shown and described in United States Letters Patent Number 3,435,412 granted on March 25, 1969 to A.H. Bohrer, Sr. for "Traffic Control Signal" and in United States Letters Patent Number 4,042,919 granted on

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August 16, 1977 to R.L. Patty for "Illuminated Sign And High Intensity Warning Device" are more suitable for portability and to be hand held. However, such devices are still battery powered and suffer from battery maintenance and replacement problems discussed for other prior art devices.

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Some signal and warning lights are constructed to be carried by barrier devices such as those shown and described in United States Letters Patent Number 3,015,804 granted on January 2, 1962 to E.D. Nunn for "Combined Barricade And Flashing Signal Light" and in United States Letters Patent Number 4,710,053 granted on December 1, 1987 to J.H. Kulp et al for "Traffic Control Elements." But such devices also suffer from problems created by batteries and battery maintenance and replacement as discussed hereinabove.

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United States Letters Patents Numbered 4,751,622 granted on June 14, 1988 to L.E. Williams for "Solar Powered Construction Light" and 4,884,017 granted on November 28, 1989 to L.E. Williams for "Solar Powered Construction Light" seek to alleviate the battery wear down, maintenance and replacement problems of prior signal and warning lights by providing solar collectors to generate electricity to recharge the batteries. However, the inherent construction of such signal and warning light devices limits their use to those requiring attachment of the signal to a barrier because these devices are not provided with means to otherwise facilitate their portability and use separate from

a barrier. In addition, such signal and warning lights are quite often used in locations where there is considerable dirt and dust, such as at construction sites. The collection of dirt and dust upon the surface of the solar collectors will reduce if not severely curtail, the efficiency and operation thereof and thus reduce battery life. Moreover, normal working conditions at such construction sites may subject such solar collectors and covers provided therefore to hazardous conditions which may result in breakage of the cover and subsequent damage to a relatively expensive solar collector.

United States Letters Patent Number 4,772,990 granted on September 20, 1988 to D.M. Linehan et al for "Solar Powered Warning Flasher" shows and describes a device similar to those described above and for similar uses but one where the solar collection is by batteries which incorporate internal photo voltaic cells. This increases the price of the batteries, possibly unduly, and provides limited light collection surfaces thus limiting the ability to collect power for storage. This type of device is also limited to use with a barrier because it is not otherwise provided with means to facilitate its ready transportability.

Solar powered battery operated and illuminated devices are also shown and described in United States Letters Patent Number 4,977,488 granted on December 11, 1990 to J.C. Spotts

et al for "Solar Powered Outdoor Recreational Light With Positionable Solar Panel" and in United States Letters Patent Number 4,989,124 granted on January 29, 1991 to T.E. Shappell for "Solar Powered Sign." However, such devices are not constructed for portability and do not adequately protect their respective solar collectors from dirt, dust and possible breakage.

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SUMMARY OF THE INVENTION

It is therefore an object of this invention to provide a new and novel signal and warning light.

10 It is another object of this invention to provide a new and novel light for signalling and warning of an emergency or hazardous condition.

15 It is yet another object of this invention to provide a new and novel emergency and hazard signal and warning light which is battery powered and utilizes solar collection of energy to recharge the batteries.

20 It is yet still another object of this invention to provide a new and novel solar and battery powered signal and warning light that is readily hand transportable.

25 It is a further object of this invention to provide a new and novel solar and battery powered signal and warning light that maximizes the impact of the sun on the solar collectors while providing a relatively strong cover for such solar collectors.

It is yet a further object of this invention to provide a new and novel solar and battery powered signal and warning light with a built in handle to facilitate its ready hand portability.

5 Other objects, features and advantages of the invention in its details of construction and arrangement of parts will be seen from the following description of the preferred embodiment when considered with the drawing and from the appended claims.

10 BRIEF DESCRIPTION OF THE DRAWING

In the drawing:

FIG. 1 is a perspective showing of an emergency/hazard signal and warning light device incorporating the instant invention;

15 FIG. 2 is an exploded perspective showing of the device of FIG. 1 turned around from the FIG. 1 view to better show the other sides thereof and with parts removed to better show details thereof;

FIG. 3 is a side elevation view of the device of FIGS. 1 and 2;

20 FIG. 4 is a plan view of the device of FIGS. 1-3; and FIG. 5 is a vertical section looking in from an end of the device of FIGS. 1-4.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to FIGS. 1 and 2 there is generally shown at 10 an emergency/hazard signal and warning light device incorporating a casing or body portion 12 and a lamp portion 14 (FIGS. 1 and 3) disposed proximate an end 16 of and carried by casing 12.

5 Body or casing portion 12 (FIGS. 1-3) includes a lower or bottom casing member 20 and an upper or top casing member 22. Bottom casing 20 is formed with a floor 30 (FIG. 2) with a pair of oppositely disposed and spaced side walls 32, 34 extending upwardly therefrom and a pair of oppositely disposed and spaced end walls 36, 38 also extending upwardly therefrom to define between walls 32-38 and above floor 30 a component space 40 open at its top. Top casing 22 is formed 10 with a top wall 50 with a pair of oppositely disposed and spaced side walls 52, 54 extending downwardly therefrom and a pair of oppositely disposed and spaced end walls 56, 58 extending downwardly therefrom to define between walls 52-58 and beneath top wall 50 a further component space 60 open at 15 its bottom. The upper peripheral edges of walls 32-38 and the lower peripheral edges of walls 52-58 are sized and configured to mate with each other so that when top casing 22 is disposed over and in contact with bottom casing 20 a closed casing 12 is formed with components space 40 and further components space 60 in communication with each 20 other.

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An attaching ring 70 is formed with a hole 72 and is carried by side wall 32 in alignment with an attaching ring 74 formed with a hole 76 and carried by side wall 34. An attaching ear 80 is formed with a hole 82 and is carried by side wall 52 in alignment with an attaching ear 84 formed with a hole 86 and carried by side wall 54. When top casing 22 is disposed over and in mating relationship with bottom casing 20 attaching ring 70 and its hole 72 are disposed in proximity to and so as to align with attaching ear 80 and its hole 82 respectively; and attaching ring 74 and its hole 76 are disposed in proximity to and so as to align with attaching ear 84 and its hole 86 respectively. When so aligned a fastener such as a threaded member 90 may be inserted through aligned holes 72, 82, 86, 76 with a head 92 of fastener 90 butted up against a lip 94 encircling hole 72 and within hole 82 and with a locking member 100 disposed within aligned holes 76, 86 and having internal threads 102 to receive and coact with external threads 98 on threaded member 90. If desired threaded member 90 may extend through locking member 100 and out the other end of threaded opening 102 thereof to facilitate attachment of device 10 to a post, pole, barricade, barrel or similar structure to position light device 10 at a desired height above the ground or a surface such as a floor, walk or the like.

If desired, top casing 22 (FIGS. 2, 3, 4 and 5) may be formed with a lip 110 (FIG. 5) extending about and from the

edges of walls 52-58 thereof for coaction with a ridge 112 extending about and from the edges of walls 32-38 of bottom casing 20 to facilitate mating of casings 20 and 22 to form housing 12.

5 A battery box 120 (FIGS. 2 and 5) is disposed on floor 30 of bottom casing 20 within its component space 40 and includes a pair of side walls 122, 124, and a pair of end walls 126, 128 (FIG. 2) all of which extend up from floor 30 to form box 120 to be open at its top. Battery box 120 is
10 of a size and configuration to receive a number of batteries 130 which in this instance are shown to be five "D" cell size batteries. Other numbers of batteries, more or less than five and sizes other than "D" cell may be utilized. Batteries 130 are of the rechargeable type for recharging by
15 solar collectors as will be hereinafter described. Inner surfaces of walls 122, 124 of battery box 120 are provided with suitable and conventional electrical conductors to electrically connect batteries 130 together in circuit and with other electrical components as will be hereinafter
20 described.

A number of standoffs or posts 140 (FIGS. 2 and 5) extend up from floor 30 of lower casing 20 and within space 40 thereof to a level above the top of battery box 130. Each post 140 is formed at its top with a notch 142 sized
25 and disposed to coact together to receive and position a PC (printed circuit) board 150 electrically connected through

electrical conductors 152 (FIG. 2) to batteries 130 and to a solar collector plate 160 also disposed within notches 142 and on top of posts 140. Solar collector plate 160 is of conventional construction to receive and collect solar energy and through conventional elements 162 carried by PC board 150 to utilize that solar energy to recharge batteries 130. Other required and conventional electrical conductors and components are provided to complete the necessary electrical circuits including an on/off switch (not shown).

5 Solar panel or collection plate 160 is disposed on top of posts 140 for disposition within a window 200 formed through top wall 50 of upper casing 22 and beneath a window cover 210 disposed over and closing window 200. Cover 210 is formed of clear LEXAN or other suitable and relatively strong and durable clear material such as plastic. Cover 10 15 210 is formed with generally triangular sides 212, 214 that support a sloping upper wall 216 and a generally curved end edge 218 that extends down from upper wall 216. The triangular wedge shaped configuration of cover 210 provides it with greater strength than a flat cover for window 200 would and facilitates the washing off of cover 210 of dirt, dust and the like by the use of water and by rain.

20 25 A light post 300 is carried by top casing 22 proximate an end 302 thereof and extends up through an opening 310 formed through top wall 50 of casing 22. A wheel like plug 320 (FIGS. 2 and 3) seats in opening 310 (FIG. 2) and

positions light stem 300 therein and with respect to top casing 22 and housing 12. A suitable and conventional light bulb 330 is disposed in a conventional light bulb socket (not shown) disposed proximate an upper end 332 of light stem 300 and which is electrically connected in circuit with PC board 150. A lens arrangement 350 (FIGS. 1 and 3) is carried by light stem 300 and plug 320 is surround and be illuminated by light bulb 330 when energized by batteries 130. Lens arrangement 350 may be a single unit or a pair of lenses suitably secured together. It may be of any suitable color and may be plain or faceted flat, curved or otherwise to suit the use and application.

A handle 400 (FIGS. 2, 3 and 4) is formed at end wall 36, 56 of casings 20, 22 respectively by forming an opening 410 therethrough of a size and configuration to permit entry therethrough of a person's hand. Handle 400 is further formed and defined by handle walls 420, 422 formed on lower casing 20 and handle walls 430, 432 formed on upper casing 22 which align and form handle 400 and opening 410 when upper casing 22 and lower casing 20 are aligned and connected together to form housing 10 as hereinabove described.

From the above description it will thus be seen that there has been shown and described a new and novel emergency/hazard warning and signal light that is solar and battery powered and relatively easily hand transportable.

It is understood that although there has been shown the preferred embodiment of the invention that various modifications may be made in the details thereof without departing from the spirit as comprehended by the following claims.

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WHAT IS CLAIMED IS:

1. A signal/warning device; comprising:

(a) housing means including a plurality of walls of a size and configuration to enclose and house predetermined components for the device;

(b) signal/warning light means carried by said housing means for disposition thereon and so as to present a signal/warning light for view;

10 (c) battery positioning means disposed within said housing means for positioning rechargeable battery means therewithin;

15 (d) solar energy collection means carried by said housing means for disposition thereby in position to coact with and be responsive to solar energy and in response thereto to generate a predetermined amount of electricity per unit time;

20 (e) electrical circuit means electrically interconnecting said solar energy collection means, battery means when disposed in said battery positioning means and said signal/warning light means to provide electrical power to said signal/warning light means to illuminate same; and

25 (f) cover means for covering said solar energy collection means and which permits solar energy to pass through said cover means for coaction with said solar energy collection means.

2. The signal/warning device of claim 1, wherein said cover means is generally wedge shaped in configuration.

3. The signal/warning device of claim 2, wherein said wedge shaped configuration of said cover means is provided by forming said cover means with opposed and space substantially triangular sides.

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4. The signal/warning device of claim 2, wherein a window is formed through a wall of said housing means of a size and configuration corresponding to that of said solar energy collection means and wherein said cover means closes said window and said solar energy collection means is disposed within said housing means beneath said cover means and so as to be positioned to coact with solar energy.

5. The signal/warning device of claim 4, including support means for positioning said solar energy collection means within said housing means.

6. The signal/warning device of claim 5, wherein said support means includes a plurality of posts extending up from a floor of said housing means and for supporting said solar energy collection means.

7. The signal/warning device of claim 6, wherein said posts also support a printed circuit board and said printed circuit board is part of said electrical circuit means.

8. The signal/warning device of claim 7, wherein said battery positioning means is in the configuration of an open top box formed within said housing means on said floor thereof.

9. The signal/warning device of claim 8, wherein said battery positioning means is of a size and configuration to house and position a predetermined number of dry cell batteries.

10. The solar/warning device of claim 9, wherein said battery positioning means is of a size and configuration to position and hold five dry cell batteries.

11. The solar/warning device of claim 9, wherein said battery positioning means is of a size and configuration to position and hold "D" size dry cell batteries.

12. The solar/warning device of claim 2, including a light stem carried by said housing means and extending upwardly therefrom and carrying proximate its free end a light bulb.

13. The solar/warning device of claim 13, including a lens arrangement disposed about and so as to cover said light stem and any light bulb carried thereby.

14. The solar/warning device of claim 13, wherein said lens arrangement includes a pair of lens members secured together to form said lens arrangement.

15. The solar/warning device of claim 14, wherein said lens arrangement is of a predetermined size, configuration, color and includes predetermined light transmission characteristics.

16. The solar/warning device of claim 2, including handle means carried by said housing means to facilitate hand transportation of the device.

17. The solar/warning device of claim 2, wherein said housing means including a first housing portion and a second housing portion each of a size and configuration to coact with the other and both together defining therewithin a component space.

18. The solar/warning device of claim 17, wherein said first housing portion and second housing portion are each

formed to provide a handle portion which align to form handle means for the device.

19. The solar/warning device of claim 18, wherein said first housing portion and said second housing portion are each molded of a suitable plastic.

20. The solar/warning device of claim 19, including a threaded securing member which connects said first housing portion and said second housing portion together to form said housing means.

21. The solar/warning device of claim 20 wherein said threaded securing member is formed to also secure the device to a device positioning structure.

FIG.1

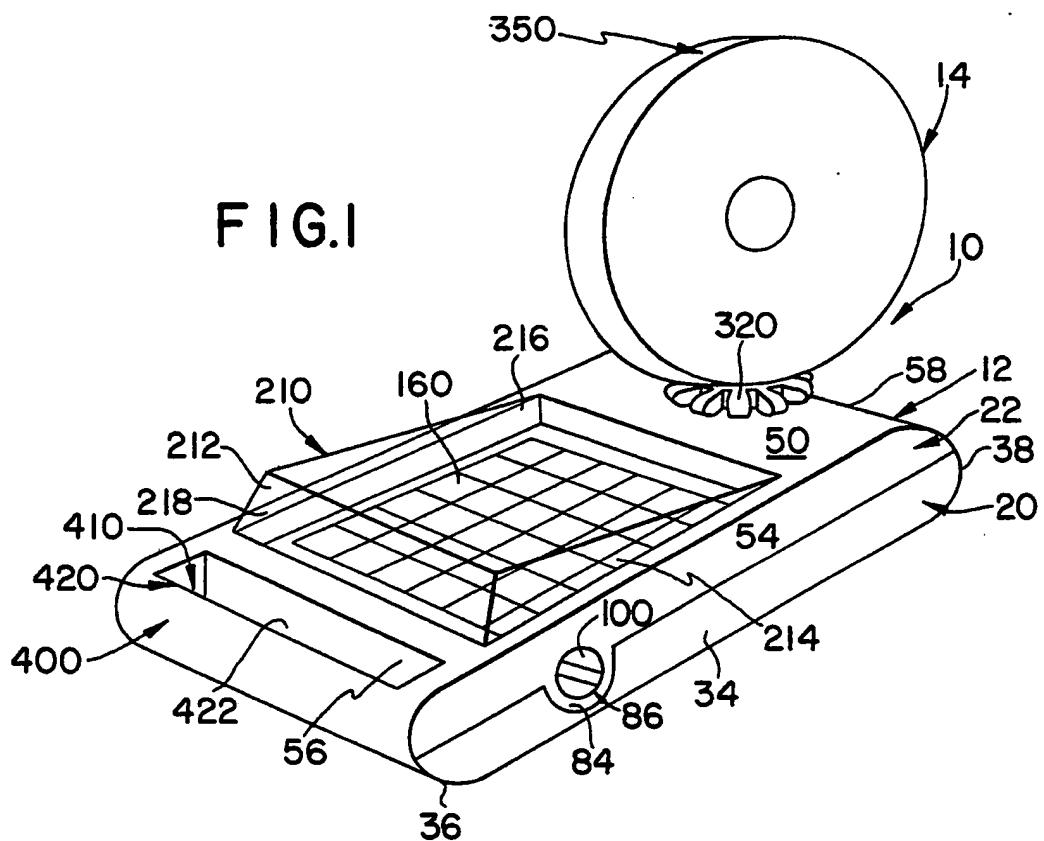
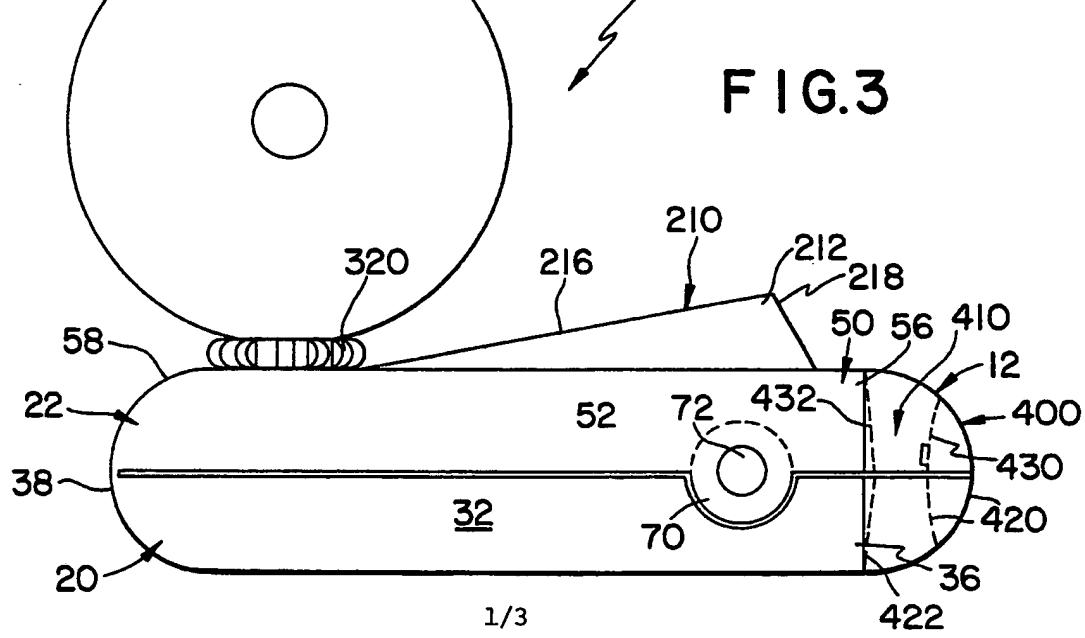


FIG.3



SUBSTITUTE SHEET

FIG.2

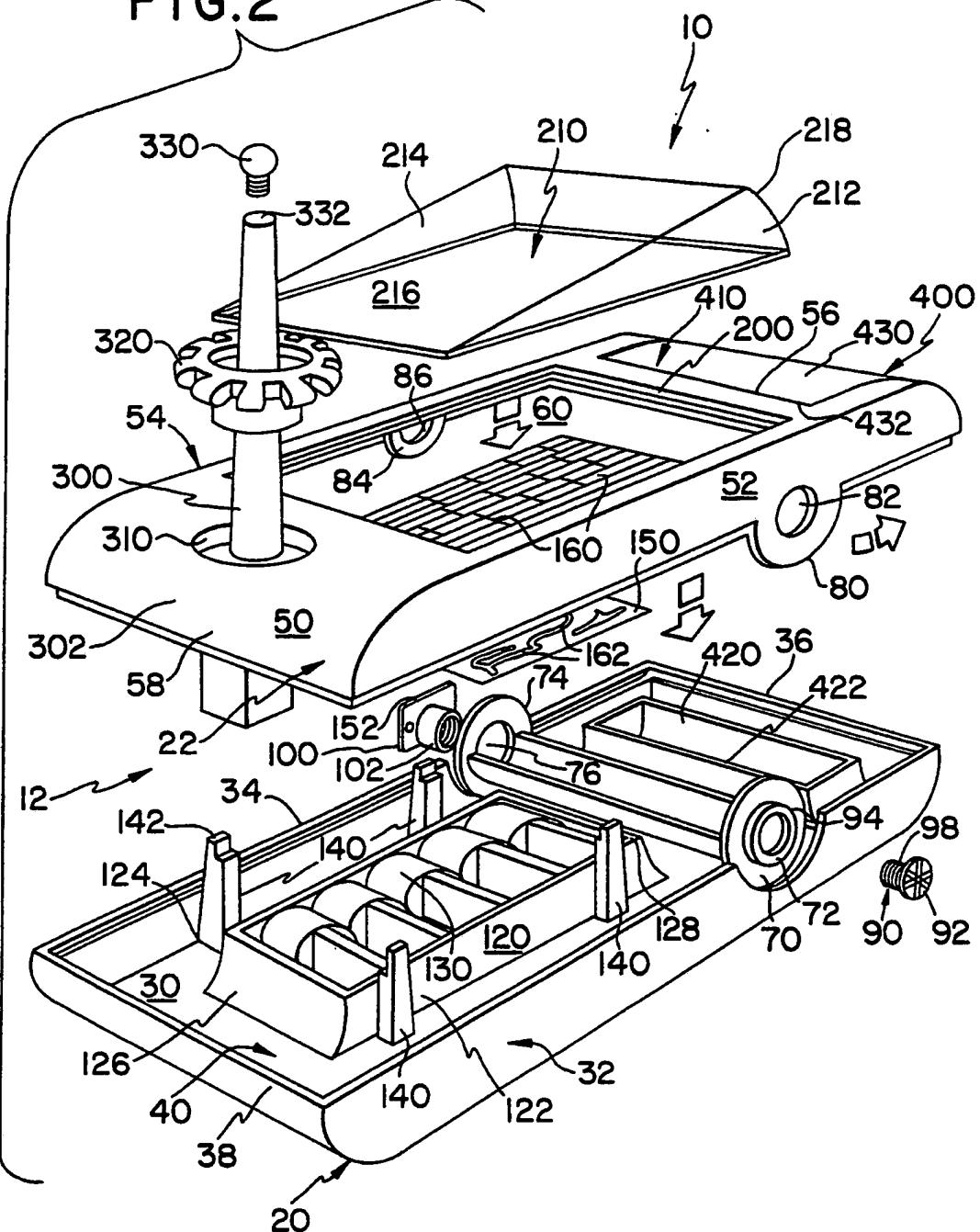


FIG.4

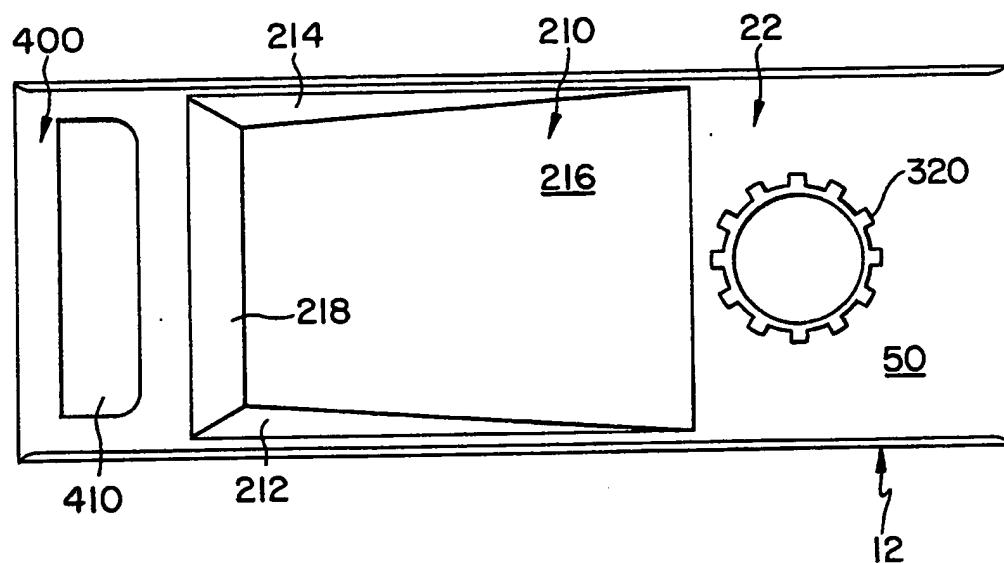
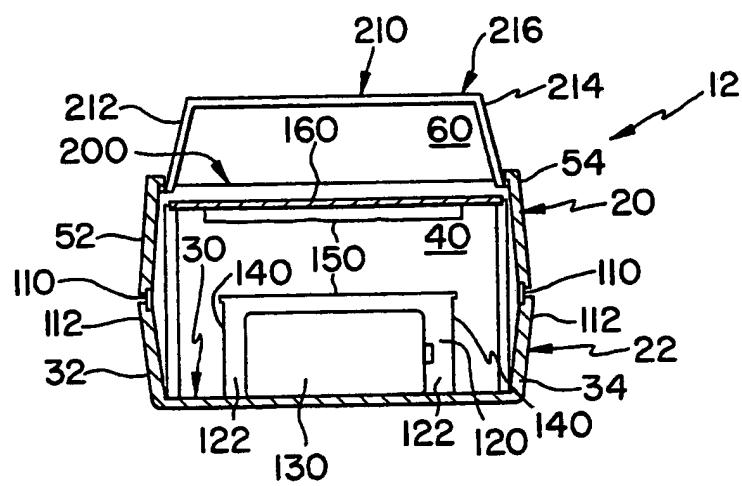


FIG.5



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US93/00439

A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) :F21L 11/00;G08G 1/095

US CL :340/908

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 340/908.1,468,471,473; 116/63P: 40/610,612,362/184

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US,A, 4,563,727 (Curiel) 07 January 1986 See the entire document.	<u>1-12,17</u> 16,18-21
Y		
X	US,A, 4,736,186 (Jones) 05 April 1988 See entire document.	<u>1-11</u> 16,18-21
Y		
X	US,A, 4,772,990 (Linehan et al.) 20 September 1988 See entire document.	<u>1-4,17</u> 16,18-21
Y		
X	US,A, 4,751,622 (Williams) 14 June 1988 See entire document.	<u>1-7,12</u> 16,18-21
Y		
X	US,A, 4,843,525 (Williams) 27 June 1985 See entire document.	<u>1-12</u> 16,18-21
Y		

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	*T*	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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Date of the actual completion of the international search	Date of mailing of the international search report
24 MARCH 1993	29 APR 1993

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US93/00439

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US,A, 5,055,984 (Hung) 08 October 1991 See entire document.	<u>1-4</u> 16,18
Y		
A	US,A, 3,818,439 (Maine) 18 June 1974 see entire document.	1-21
Y	Practical Wireless, October 1980, Vol. 56, no. 9, B.V. Cordingley, "Rechargeable Handlamp", pages 53-56.	16,18